OpTech

A Comprehensive Approach to Educating and Improving Organizational Systems Engineering

Is There a Problem?

- **1950's & 1960's**
  - **Nuclear Subs in a Few Years**
  - **3 Generations of ICBM, control system, launch facilities in 7 years!**
  - **Man on the moon in 7 years**
- **Today**
  - **Minor improvement to ICBM took 7 years at 2.3B!**
  - **Few revolutionary changes**
  - **Few visible fruits from the many reforms**
  - **Many programs in trouble**

So Many Reforms, So Little Progress

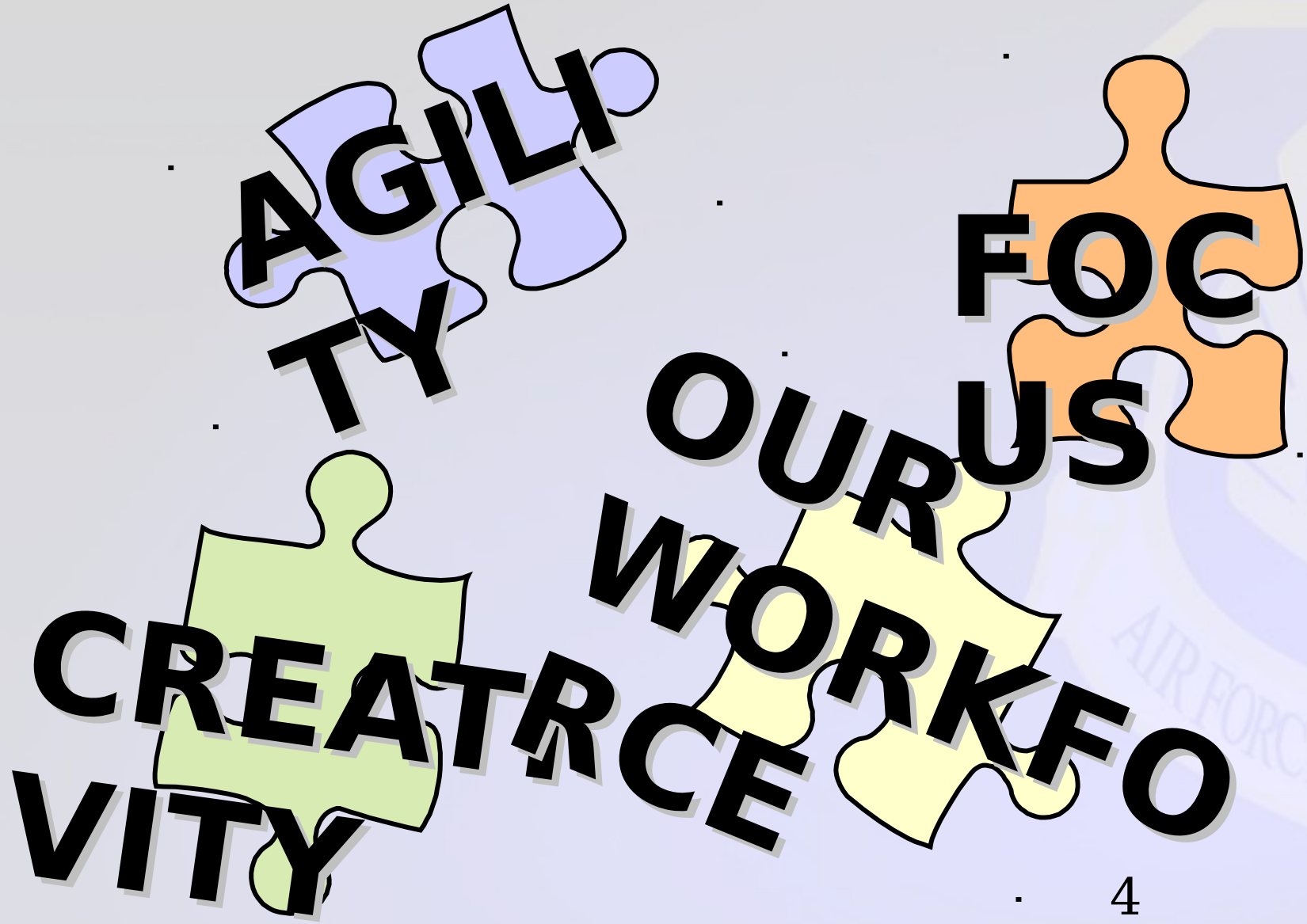
- McNamara 1960-1968
  - Planning, Programming Budgeting System (PPBS)
  - Offices of Defense Analysis
  - Total … (TPPC) ??? Don't know the acronym??
- Early 1970's – Packard I: "decentralized" by ADDING service-level bureaucracies
- Early 1980's – Carlucci: small reductions in program bureaucracy (making phases optional)
- Late 1980's – Packard II: Moved program authority from Acquisition community to military operational (user) commands
- 1990's – "Acquisition Reform", revisit of McNamara Reforms!

Results:

-2-5 year minimum delay to program starts

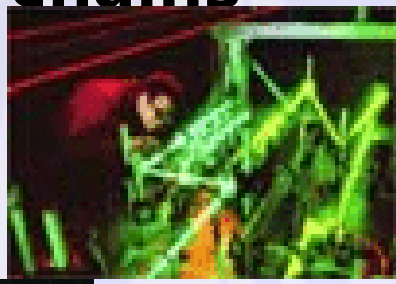
-NO proven savings in time, money or quality

What Have We Lost?



How Has the Tech World Changed?

- "New" economy
  - Distributed product development
  - Global market
  - End of monoliths, growth of supply chains
- Era of exponential trends
  - Moore's Law
  - Telecommunications
  - Sensors
  - …



What Reforms Should Be Done?

- **Rebuild Workforce**
  - **Education**
  - **1st Job Experience**
  - **Promote Technical Excellence**
- **Encourage Creativity**
  - **“Venture Funds”**
  - **Freely restructured organizations**
- **Incentivize Time-to-Market**
- **Greatly reduce ponderous planning/programming staffs/processes**
- **Reform contracting to open the market to companies outside the defense sector**

What is OpTech?

- ***Op*erational Immersion Into The World Of The Warfighter**
  - **Efficient Operational Immersion For S&Es**
  - **Better Understand Our Customers**
  - **Create Positive Exposure Between Operators And S&Es**

- ***Tech*nical Immersion Into The Industrial Base & Academe**
  - **Discover Disruptive Technologies**
  - **Link tech base to AF needs**

- **Develop Technical Leader**
  And Teamwork

OpTech has Many Goals!

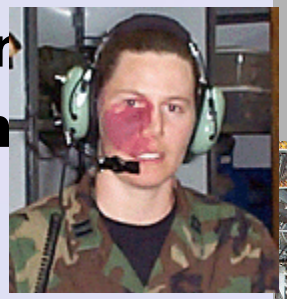
- Time efficient alternative to broadening for those who primarily intend to remain S&E's
- Leadership development in technically relevant manner
- Bolsters recruiting and retention
- Develops S&E skills
- Teaches important skills of finding/exploiting information from tech base
- May reduce dependence upon contractor judgment
- Source of fleshed-out new ideas!

Summary of Pilot Program

- Recruited 8 S&E Officers from AFRL and ASC
- Op Phase (SpecOps)
  - Studied Doctrine, Platforms, Weapons (Jun-Jul)
  - Oral Exam (8 Aug)
  - 10 days Hurlburt visit attending ISOC, Mission Flights, other events (10-20 Aug)
- Tech Phase on chosen Precision UAV CAS Project
  - Initial design work (Sep-mid Oct)
  - 2 Field Trips
    - CTIA Wireless convention (15-18 Oct)
    - Los Angeles-American GNC, CV-22, JPL, Robinson Helicopter, USC autonomous helicopter project (3-8 Nov)
- Final Report & briefings (Jan)

Regular Oral/Written Exams are Key Gateways

- **Students must pass oral prior to Ops Immersion**
- **Must show graduate-level mastery appropriate to time given**
  - **User**
  - **Related work**
  - **Relevant math**
- **Must suggest innovative solution**
- **Passing is far from guaranteed!**



Some Oral Topics at 2-Month Point

-Tactical target designator

-Handheld laser cauterizer

-Artificial cloud for IR

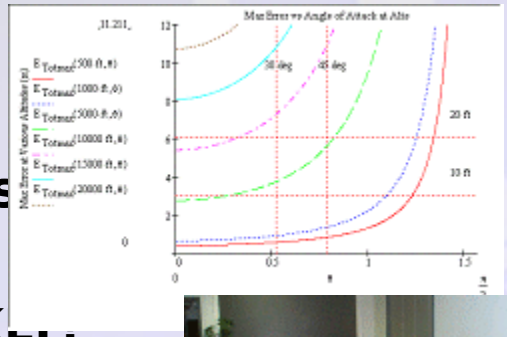
te

site/aerogel

to IR masking

A Report Card on Ourselves

- **Efficient exposure to operations**
  - **Good interpersonal communication**
  - **Understanding of problem set**
  - **Focus on ops, not maintenance or management**
- **Development of management skills**
  - **Understand user**
  - **Pick & analyze opportunities QUICKLY**
- **Development of S&E Skills**
  - **Broaden knowledge of many technologies**
- **Exposure to Industry**
  - **Broad industrial basis**
  - **Not restricted to defense sector**
- **Make it fun**



The Pilot Class

8 Entered

-2 eliminated (schedule conflicts)

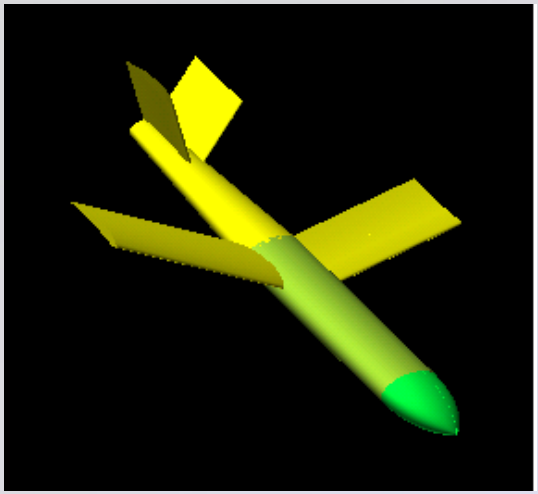
-1 failed oral exam

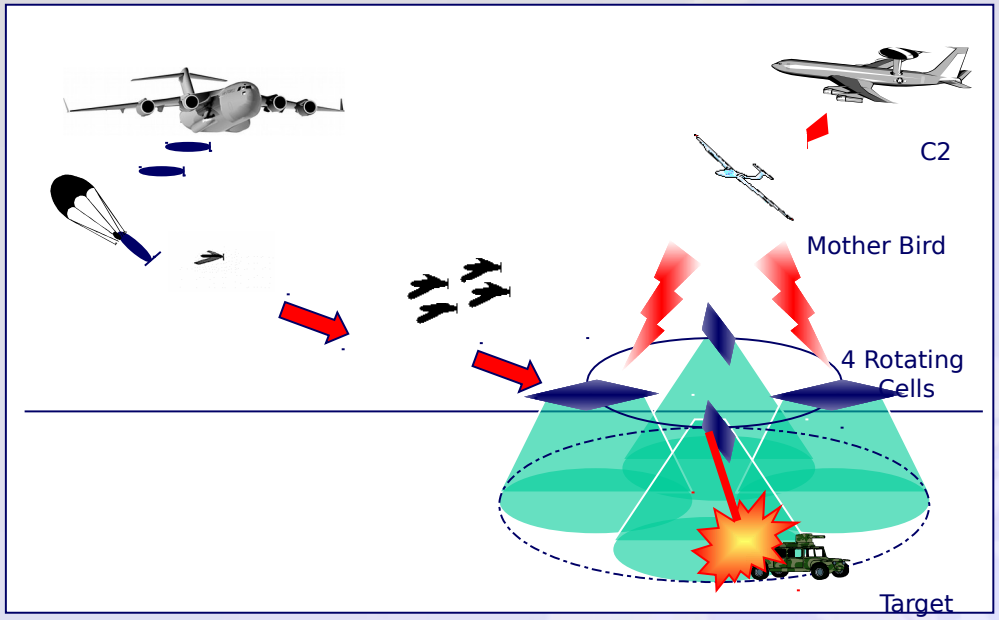
5 Initial graduates

- **Staff**
  - **2 “Technical” moderators**
    - **Tech Ph.D.’s**
    - **Research Experience**
    - **Field Grade**
  - **1 “Operational moderator**
    - **Field Grade**
    - **Ops & Command Experience**
  - **1 Course Developer/Administrator**

The Pilot Class Project - VESPA

- **Constellation of small killer-CAS UAVs**





Motivation

- **AFSOC gunship missions**
- **Desired improvements: “one-shot-one-kill”, and survivability**
- **Not likely with large manned airframe**
- **Hence the opportunity for innovation**

Expansion of Students and Moderators

Students

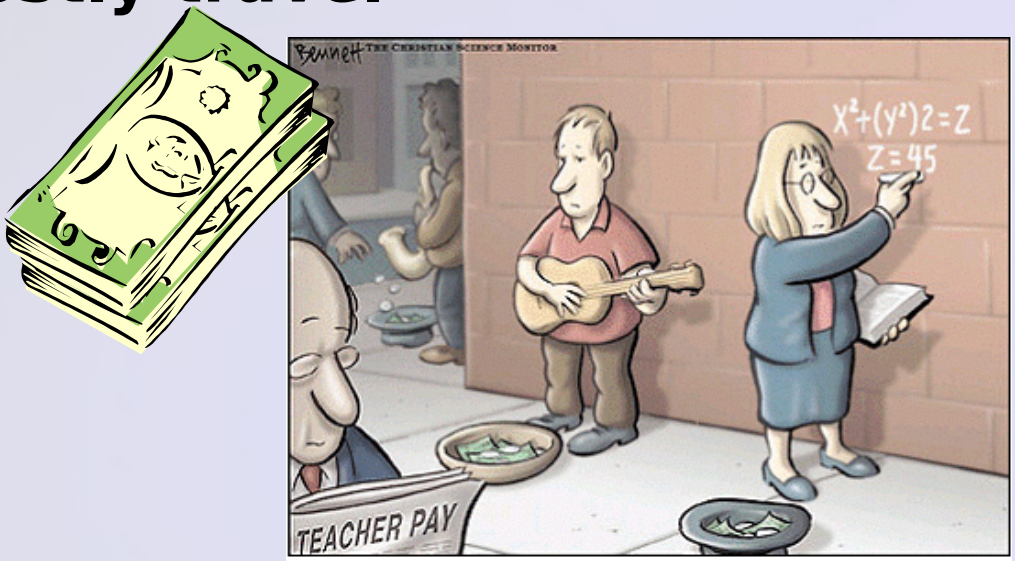
- **Second OpTech Class started on Fighter Operations**
- **Will study F-15E system, including simulators/flight time**

Moderators

- **Keeping Standards is Critical!**
- **Part-time moderators**
- **Strong credentials**
- **Ready senior mentors**
- **Always least two moderators**
  - **Provides growth path (all moderators were once assitants)**

Administration, Course Development, Cost

- **Independent administrator is critical to success**
  - **Otherwise, moderator/students easily lose focus managing details**
- **About ¼ time job to coordinate cl**
- **Cost is about $10,000/student**
  - **Mostly travel**



Summary

- OpTech changes the first job experience
  - Bridges education and military technical work
- OpTech teaches systems engineering in a hands-on way
- Is only one of several reforms to change the way we do business
- Will certainly need support if it is going to continu